



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/593,375

02/26/2007

Yousuke Sakao

20266

1278

23389 7590 11/24/2010  
SCULLY SCOTT MURPHY & PRESSER, PC  
400 GARDEN CITY PLAZA  
SUITE 300  
GARDEN CITY, NY 11530

EXAMINER

COLUCCI, MICHAEL C

ART UNIT

PAPER NUMBER

2626

MAIL DATE

DELIVERY MODE

11/24/2010

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/593,375	<b>Applicant(s)</b> SAKAO ET AL.	
	<b>Examiner</b> MICHAEL C. COLUCCI	<b>Art Unit</b> 2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on 17 September 2010.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1, 2, 4, 5, 7-10, 12, 13, 15, 16, and 18-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4, 5, 7-10, 12, 13, 15, 16 and 18-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments filed 09/17/2010 have been fully considered but they are not persuasive.

#### **Argument (page 12 ¶ 2 - page 13 ¶ 1 & page 14 ¶ 1):**

- “Kumai does not teach or suggest performing parallel modification of the sentence structure as recited in the independent claims of the present invention”
- “Akers does not teach or suggest performing parallel modification of the sentence structure”

#### **Response to argument:**

Examiner disagrees and maintains the use of Kumai in view of Akers. Examiner looks to the specification for the use of "parallel modification of the sentence structure", where Examiner finds that *“Referring to FIG. 18, the similar-structure generating means 22 modifies the parallel structure (step A2-1 in FIG. 8), subsequently modifies a connecting relationship between hayai (fast)” and yasui (cheap)” as a parallel relationship in a partial structure 2a-0, and generates a similar structure 2a-1”* (present invention spec. [0170]).

Further the Drawings of the present invention show:

SENTENCE 1: FAST TYPE A OF VEHICLE IS CHEAP	速い車種Aは安い
SENTENCE 2: FAST AND CHEAP TYPE A OF VEHICLE	速く安い車種A
SENTENCE 3: HIGH-VELOCITY TYPE A OF VEHICLE THAT HAS BEEN CHEAP	安かった高速な車種A

FIG. 15

Examiner therefore understands that the parallel modification modifies a connecting relationship between two sentences elements. Therefore, Kumai teaches dealing with varying sentence structures via a well known uses of a text mining method capable of acquiring qualitative knowledge is known. Concretely speaking, for example, JP-A-2001-84250 describes such a text mining method. That is, the language feature analyzing apparatus forms the field-dependent dictionary from the document data in order to improve the analysis precision of the language analyzing apparatus; the language analyzing apparatus forms the structural sentence trees by considering both the co-occurrence relationship and the correlative relationship; and then, since the pattern extracting apparatus employs this structural sentence tree, this pattern extracting apparatus properly extracts/outputs the frequently appearing patterns (namely knowledge), so that the language analyzing apparatus can more precisely classify the frequently appearing patterns so as to extract the knowledge (Kumai [0008]).

Art Unit: 2626

However, consider Fig. 5 of Kumai in view of Fig. 15 and 17 of the present invention which shows varying forms of a sentence, wherein Kumai like the present invention *modifies a connecting relationship between two sentences elements*. This allows for an improved extraction of a similar sentence, wherein a degree can indicate whether there is a partial resemblance, such as by setting a threshold or trigger value to indicate similarity between sentence structure. As shown in figure 5 below, the context of sentences that were mined are similar, however there are sentences indicating a partial resemblance such as:

*"want to replace an electric cord of an iron"*

compared to the seed sentence shown as

*"a fuse of an iron has been cut out. How this cut-out fuse is replaced by a new fuse?"*

FIG. 5

**RESEMBLED SENTENCE  
RETRIEVING TOOL**

RESEMBLED SENTENCE  
RETRIEVE

**EXECUTE**

SEED SENTENCE

A FUSE OF AN IRON  
 HAS BEEN CUT OUT.  
 HOW THIS CUT-OUT  
 FUSE IS REPLACED  
 BY A NEW FUSE ?

DATA CONDITION SETTING

MEMORANDUM

CONSEQUENCE  
REGISTER

**RESULT DISPLAY**

RETRIEVE RESULT LIST

DOCUMENT NUMBER	RESEMBLANCE DEGREE	CONTENT
15	100	A FUSE OF AN IRON HAS BEEN CUT OUT. HOW THIS CUT-OUT FUSE IS REPLACED BY A NEW FUSE ?
112	65	WANT TO CONFIRM AS TO WHETHER OR NOT A FUSE OF AN IRON HAS BEEN CUT OUT.
58	60	A FUSE IS CUT OUT MANY TIMES. IS ANY FAILURE INVOLVED IN WIRING LINE ?
13	55	WANT TO REPLACE AN ELECTRIC CORD OF AN IRON.

Further, consider Akers to improve the use of Kumai, such as by analyzing Japanese to English sentence translations with respect to syntax, wherein the semantic property of "an arrow" (symbol vs. weapon) is used in evaluating the verb phrase "like an arrow" in the sentence "They would like an arrow." In contrast, if the syntax of the phrase "an arrow" were changed as in "He shot it with an arrow," the semantic property of "an arrow" is not used in evaluating the verb phrase "shot it with an arrow." (Akers Col. 7 lines 9-15).

Furthermore, Akers teaches improvements in the same context as Kumai for Japanese and English syntactic understanding, such as "cat" and "dog" are more related than "cat" and "pudding", and hence the former pair would be separated by a smaller distance within the tree. "Animal" and "cat" are examples of words that are

Art Unit: 2626

stored at different levels in the tree, as "animal" is a more abstract term than "cat."

(Akers Col. 10 line 59 – Col. 11 line 10).

Therefore, Examiner believes that Kumai teaches parallel modification such as modifying a connecting relationship between two sentences elements as taught in Fig. 5 of Kumai. Further, the synonym dictionary of Kumai can easily be used to understand words with varying syntax but a similar meaning in both English and Japanese.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 2, 4, 5, 7-10, 12, 13, 15, 16, and 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akers et al. US 6278967 B1 (hereinafter Akers) in view of Kumai US 20040260979 A1 (hereinafter Kumai).

Re claims 1 and 12, Kumai teaches text mining apparatus comprising:

means for generating a sentence structure from an input document ([0062] & Fig.

5);

means for generating a similar structure of patterns having a similar meaning of a partial structure of the sentence structure by performing predetermined conversion operation ([0062] & Fig. 5),

including at least change in connection of branches in a graph structure, of the partial structure; and

means for determining the patterns having the similar meaning as the identical pattern and detecting the pattern ([0062] & Fig. 5)

means for performing parallel modification of the sentence structure ([0062] & Fig. 5);

wherein the means for generating the similar structure comprises:

means for performing parallel modification of the sentence structure ([0062] & Fig. 5, "content" variations of meaning with respect to the seed sentence);

means for generating a partial structure of the sentence structure ([0062] & Fig. 5 resemblance degree for partial resemblance);

means for replacing a synonym in the sentence structure and/or partial structure by referring to a synonym dictionary ([0062] & Fig. 5); and

the means for generating the similar structure uses the similar structures as an equivalent class ([0008] classification) of the partial structure of the sentence structure ([0062] & Fig. 5)



However, Kumai fails to teach including at least change in connection of branches in a graph structure, of the partial structure.

Akers teaches a translation engine includes a preparer, a parser, a graph maker, an evaluator, a graph scorer, a parse extractor, and a structural converter. The preparer examines the input text and resolves any ambiguities in input sentence boundaries. The preparer then creates and displays the input text in a parse chart seeded with dictionary entries. The parser parses the chart to obtain possible syntactic categories for the input text. The graph maker produces a graph of the possible syntactic interpretations of the input text based on the parse chart. The graph includes nodes and subnodes which are associated with possible interpretations of the input text. The evaluator, which comprises a series of experts, evaluates the graph of the possible interpretations and adds expert weights to the nodes and subnodes of the graph. The graph scorer uses the expert weights to score the subnodes, and the graph scorer then associates the N best scores with each node. The parse extractor assigns a parse tree structure to the preferred interpretation as determined by the graph scorer. The structural converter performs a structural conversion operation on the parse tree structure to obtain a translation in the target language (Akers Col. 4 lines 41-67).

Further, Akers teaches that the order in which nodes are visited and scored is a standard depth-first graph-walking algorithm. In this algorithm, nodes that have been scored are marked and are not scored again. During the scoring process, the scoring module evaluates dictionary entry nodes before evaluating any of the higher unit nodes. Each dictionary entry gives rise to a single score. For a unary rule, each of the k scores

Art Unit: 2626

of the lower export is added to the expert values that apply to the unary rule, and the resulting vector of  $k$  scores is associated with the parent export. For a binary rule, assume that the left child has  $g$  scores and the right child has  $h$  scores. Then a total of  $g$  times  $h$  scores are computed by adding each of the left child's scores to each of the right child's scores, and in addition, adding the expert values that apply to the binary rule. When  $g$  times  $h$  exceeds  $N$ , only the  $N$  best scores are kept with the parent node (Akers Col. 8 lines 6-12).

Furthermore, Akers teaches user interaction which can change the conversion of a sentence and its corresponding tree structure generation (Akers Col. 9 lines 1-45).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Kumai to incorporate including at least change in connection of branches in a graph structure, of the partial structure as taught by Akers to allow for a user interface (Akers Col. 8 lines 6-12) having the ability to generate a tree structure which compares various sentential outputs depending on scores within the nodes of a tree structure (Akers Col. 4 lines 41-67), wherein the order of words in a sentence may not reflect the best meaning and can be varied to produce the best scoring tree with the same overall structure but with a better meaning (Akers Col. 8 lines 6-12) based on user preferences.

However, Kumai fails to teach means for performing non-directional branching of a directional branch of the sentence structure and/or partial structure and

Art Unit: 2626

means for performing non-ordering of ordering trees of the sentence structure and/or partial structure

Akers teaches a translation engine includes a preparer, a parser, a graph maker, an evaluator, a graph scorer, a parse extractor, and a structural converter. The preparer examines the input text and resolves any ambiguities in input sentence boundaries. The preparer then creates and displays the input text in a parse chart seeded with dictionary entries. The parser parses the chart to obtain possible syntactic categories for the input text. The graph maker produces a graph of the possible syntactic interpretations of the input text based on the parse chart. The graph includes nodes and subnodes which are associated with possible interpretations of the input text. The evaluator, which comprises a series of experts, evaluates the graph of the possible interpretations and adds expert weights to the nodes and subnodes of the graph. The graph scorer uses the expert weights to score the subnodes, and the graph scorer then associates the N best scores with each node. The parse extractor assigns a parse tree structure to the preferred interpretation as determined by the graph scorer. The structural converter performs a structural conversion operation on the parse tree structure to obtain a translation in the target language (Akers Col. 4 lines 41-67).

Further, Akers teaches that the order in which nodes are visited and scored is a standard depth-first graph-walking algorithm. In this algorithm, nodes that have been scored are marked and are not scored again. During the scoring process, the scoring module evaluates dictionary entry nodes before evaluating any of the higher unit nodes. Each dictionary entry gives rise to a single score. For a unary rule, each of the k scores

Art Unit: 2626

of the lower export is added to the expert values that apply to the unary rule, and the resulting vector of  $k$  scores is associated with the parent export. For a binary rule, assume that the left child has  $g$  scores and the right child has  $h$  scores. Then a total of  $g$  times  $h$  scores are computed by adding each of the left child's scores to each of the right child's scores, and in addition, adding the expert values that apply to the binary rule. When  $g$  times  $h$  exceeds  $N$ , only the  $N$  best scores are kept with the parent node (Akers Col. 8 lines 6-12).

Furthermore, Akers teaches user interaction which can change the conversion of a sentence and its corresponding tree structure generation (Akers Col. 9 lines 1-45).

Therefore, it would have also been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Kumai to incorporate means for performing non-directional branching of a directional branch of the sentence structure and/or partial structure and means for performing non-ordering of ordering trees of the sentence structure and/or partial structure as taught by Akers to allow for a user interface (Akers Col. 8 lines 6-12) having the ability to generate a tree structure which compares various sentential outputs depending on scores within the nodes of a tree structure (Akers Col. 4 lines 41-67), wherein the order of words in a sentence may not reflect the best meaning and can be varied to produce the best scoring tree with the same overall structure but with a better meaning (Akers Col. 8 lines 6-12) based on user preferences.

Re claims 2 and 13, Kumai teaches a text mining apparatus according to Claim 1, further comprising:

a storage unit that stores a set of documents ([0062] & Fig. 5) as a text mining object ([0008]); and

an analyzing unit that inputs and analyzes the document of the storage unit and obtains the sentence structure ([0062] & Fig. 5),

wherein the analyzing unit analyzes the document, and generates the sentence structure ([0062] & Fig. 5) containing a clause having a node and indicating at least a dependency as a directional branch from the node on a modifier to the node on a modifiee.

However, Kumai fails to teach a clause having a node and indicating at least a dependency as a directional branch from the node on a modifier to the node on a modifiee.

Akers teaches a translation engine includes a preparer, a parser, a graph maker, an evaluator, a graph scorer, a parse extractor, and a structural converter. The preparer examines the input text and resolves any ambiguities in input sentence boundaries. The preparer then creates and displays the input text in a parse chart seeded with dictionary entries. The parser parses the chart to obtain possible syntactic categories for the input text. The graph maker produces a graph of the possible syntactic interpretations of the input text based on the parse chart. The graph includes nodes and subnodes which are associated with possible interpretations of the input text. The evaluator, which comprises a series of experts, evaluates the graph of the possible

Art Unit: 2626

interpretations and adds expert weights to the nodes and subnodes of the graph. The graph scorer uses the expert weights to score the subnodes, and the graph scorer then associates the N best scores with each node. The parse extractor assigns a parse tree structure to the preferred interpretation as determined by the graph scorer. The structural converter performs a structural conversion operation on the parse tree structure to obtain a translation in the target language (Akers Col. 4 lines 41-67).

Further, Akers teaches that the order in which nodes are visited and scored is a standard depth-first graph-walking algorithm. In this algorithm, nodes that have been scored are marked and are not scored again. During the scoring process, the scoring module evaluates dictionary entry nodes before evaluating any of the higher unit nodes. Each dictionary entry gives rise to a single score. For a unary rule, each of the k scores of the lower export is added to the expert values that apply to the unary rule, and the resulting vector of k scores is associated with the parent export. For a binary rule, assume that the left child has g scores and the right child has h scores. Then a total of g times h scores are computed by adding each of the left child's scores to each of the right child's scores, and in addition, adding the expert values that apply to the binary rule. When g times h exceeds N, only the N best scores are kept with the parent node (Akers Col. 8 lines 6-12).

Furthermore, Akers teaches user interaction which can change the conversion of a sentence and its corresponding tree structure generation (Akers Col. 9 lines 1-45).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Kumai to incorporate a clause having a

Art Unit: 2626

node and indicating at least a dependency as a directional branch from the node on a modifier to the node on a modifiee as taught by Akers to allow for a user interface (Akers Col. 8 lines 6-12) having the ability to generate a tree structure which compares various sentential outputs depending on scores within the nodes of a tree structure (Akers Col. 4 lines 41-67), wherein the order of words in a sentence may not reflect the best meaning and can be varied to produce the best scoring tree with the same overall structure but with a better meaning (Akers Col. 8 lines 6-12) based on user preferences.

Re claims 4, 15, and 23, Kumai teaches a text mining apparatus comprising:  
a storage unit that stores a set of documents ([0062] & Fig. 5) as a text mining object ([0008]);

an analyzing unit that reads and analyzes the document from the storage unit and obtains the sentence structure ([0062] & Fig. 5);

a similar-structure generating unit that performs predetermined modification operation ([0062] & Fig. 5),

including at least change in connection of branches in a graph structure,  
of the partial structure of the sentence structure obtained by the analysis of the analyzing unit, and generates a similar structure of patterns having a similar meaning ([0062] & Fig. 5); and

a pattern detecting unit that uses the similar structure generated by the similar-structure generating unit as an equivalent class of the partial structure on the generation source, and detects the pattern ([0062] & Fig. 5)

wherein the means for generating the similar structure comprises:

means for performing parallel modification of the sentence structure ([0062] & Fig. 5, "content" variations of meaning with respect to the seed sentence);

means for generating a partial structure of the sentence structure ([0062] & Fig. 5 resemblance degree for partial resemblance);

means for replacing a synonym in the sentence structure and/or partial structure by referring to a synonym dictionary ([0062] & Fig. 5); and

the means for generating the similar structure uses the similar structures as an equivalent class ([0008] classification) of the partial structure of the sentence structure ([0062] & Fig. 5)

However, Kumai fails to teach including at least change in connection of branches in a graph structure, of the partial structure.

Akers teaches a translation engine includes a preparer, a parser, a graph maker, an evaluator, a graph scorer, a parse extractor, and a structural converter. The preparer examines the input text and resolves any ambiguities in input sentence boundaries. The preparer then creates and displays the input text in a parse chart seeded with dictionary entries. The parser parses the chart to obtain possible syntactic



Art Unit: 2626

categories for the input text. The graph maker produces a graph of the possible syntactic interpretations of the input text based on the parse chart. The graph includes nodes and subnodes which are associated with possible interpretations of the input text. The evaluator, which comprises a series of experts, evaluates the graph of the possible interpretations and adds expert weights to the nodes and subnodes of the graph. The graph scorer uses the expert weights to score the subnodes, and the graph scorer then associates the N best scores with each node. The parse extractor assigns a parse tree structure to the preferred interpretation as determined by the graph scorer. The structural converter performs a structural conversion operation on the parse tree structure to obtain a translation in the target language (Akers Col. 4 lines 41-67).

Further, Akers teaches that the order in which nodes are visited and scored is a standard depth-first graph-walking algorithm. In this algorithm, nodes that have been scored are marked and are not scored again. During the scoring process, the scoring module evaluates dictionary entry nodes before evaluating any of the higher unit nodes. Each dictionary entry gives rise to a single score. For a unary rule, each of the k scores of the lower export is added to the expert values that apply to the unary rule, and the resulting vector of k scores is associated with the parent export. For a binary rule, assume that the left child has g scores and the right child has h scores. Then a total of g times h scores are computed by adding each of the left child's scores to each of the right child's scores, and in addition, adding the expert values that apply to the binary rule. When g times h exceeds N, only the N best scores are kept with the parent node (Akers Col. 8 lines 6-12).

Furthermore, Akers teaches user interaction which can change the conversion of a sentence and its corresponding tree structure generation (Akers Col. 9 lines 1-45).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Kumai to incorporate including at least change in connection of branches in a graph structure, of the partial structure as taught by Akers to allow for a user interface (Akers Col. 8 lines 6-12) having the ability to generate a tree structure which compares various sentential outputs depending on scores within the nodes of a tree structure (Akers Col. 4 lines 41-67), wherein the order of words in a sentence may not reflect the best meaning and can be varied to produce the best scoring tree with the same overall structure but with a better meaning (Akers Col. 8 lines 6-12) based on user preferences.

However, Kumai fails to teach means for performing non-directional branching of a directional branch of the sentence structure and/or partial structure and

means for performing non-ordering of ordering trees of the sentence structure and/or partial structure

Akers teaches a translation engine includes a preparer, a parser, a graph maker, an evaluator, a graph scorer, a parse extractor, and a structural converter. The preparer examines the input text and resolves any ambiguities in input sentence boundaries. The preparer then creates and displays the input text in a parse chart seeded with dictionary entries. The parser parses the chart to obtain possible syntactic categories for the input text. The graph maker produces a graph of the possible

Art Unit: 2626

syntactic interpretations of the input text based on the parse chart. The graph includes nodes and subnodes which are associated with possible interpretations of the input text. The evaluator, which comprises a series of experts, evaluates the graph of the possible interpretations and adds expert weights to the nodes and subnodes of the graph. The graph scorer uses the expert weights to score the subnodes, and the graph scorer then associates the N best scores with each node. The parse extractor assigns a parse tree structure to the preferred interpretation as determined by the graph scorer. The structural converter performs a structural conversion operation on the parse tree structure to obtain a translation in the target language (Akers Col. 4 lines 41-67).

Further, Akers teaches that the order in which nodes are visited and scored is a standard depth-first graph-walking algorithm. In this algorithm, nodes that have been scored are marked and are not scored again. During the scoring process, the scoring module evaluates dictionary entry nodes before evaluating any of the higher unit nodes. Each dictionary entry gives rise to a single score. For a unary rule, each of the k scores of the lower export is added to the expert values that apply to the unary rule, and the resulting vector of k scores is associated with the parent export. For a binary rule, assume that the left child has g scores and the right child has h scores. Then a total of g times h scores are computed by adding each of the left child's scores to each of the right child's scores, and in addition, adding the expert values that apply to the binary rule. When g times h exceeds N, only the N best scores are kept with the parent node (Akers Col. 8 lines 6-12).

Art Unit: 2626

Furthermore, Akers teaches user interaction which can change the conversion of a sentence and its corresponding tree structure generation (Akers Col. 9 lines 1-45).

Therefore, it would have also been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Kumai to incorporate means for performing non-directional branching of a directional branch of the sentence structure and/or partial structure and means for performing non-ordering of ordering trees of the sentence structure and/or partial structure as taught by Akers to allow for a user interface (Akers Col. 8 lines 6-12) having the ability to generate a tree structure which compares various sentential outputs depending on scores within the nodes of a tree structure (Akers Col. 4 lines 41-67), wherein the order of words in a sentence may not reflect the best meaning and can be varied to produce the best scoring tree with the same overall structure but with a better meaning (Akers Col. 8 lines 6-12) based on user preferences.

Re claims 5 and 16, Kumai teaches a text mining apparatus according to Claim 4, wherein the pattern detecting unit uses the similar structure as the equivalent class of the partial structure on the generation source, and detects the pattern ([0062] & Fig. 5).

However, Kumai fails to teach means for performing non-ordering of ordering trees in the sentence structure and/or partial structure

Akers teaches a translation engine includes a preparer, a parser, a graph maker, an evaluator, a graph scorer, a parse extractor, and a structural converter. The preparer examines the input text and resolves any ambiguities in input sentence boundaries. The preparer then creates and displays the input text in a parse chart seeded with dictionary entries. The parser parses the chart to obtain possible syntactic categories for the input text. The graph maker produces a graph of the possible syntactic interpretations of the input text based on the parse chart. The graph includes nodes and subnodes which are associated with possible interpretations of the input text. The evaluator, which comprises a series of experts, evaluates the graph of the possible interpretations and adds expert weights to the nodes and subnodes of the graph. The graph scorer uses the expert weights to score the subnodes, and the graph scorer then associates the N best scores with each node. The parse extractor assigns a parse tree structure to the preferred interpretation as determined by the graph scorer. The structural converter performs a structural conversion operation on the parse tree structure to obtain a translation in the target language (Akers Col. 4 lines 41-67).

Further, Akers teaches that the order in which nodes are visited and scored is a standard depth-first graph-walking algorithm. In this algorithm, nodes that have been scored are marked and are not scored again. During the scoring process, the scoring module evaluates dictionary entry nodes before evaluating any of the higher unit nodes. Each dictionary entry gives rise to a single score. For a unary rule, each of the k scores of the lower export is added to the expert values that apply to the unary rule, and the resulting vector of k scores is associated with the parent export. For a binary rule,

Art Unit: 2626

assume that the left child has  $g$  scores and the right child has  $h$  scores. Then a total of  $g$  times  $h$  scores are computed by adding each of the left child's scores to each of the right child's scores, and in addition, adding the expert values that apply to the binary rule. When  $g$  times  $h$  exceeds  $N$ , only the  $N$  best scores are kept with the parent node (Akers Col. 8 lines 6-12).

Furthermore, Akers teaches user interaction which can change the conversion of a sentence and its corresponding tree structure generation (Akers Col. 9 lines 1-45).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Kumai to incorporate means for performing non-ordering of ordering trees in the sentence structure and/or partial structure as taught by Akers to allow for a user interface (Akers Col. 8 lines 6-12) having the ability to generate a tree structure which compares various sentential outputs depending on scores within the nodes of a tree structure (Akers Col. 4 lines 41-67), wherein the order of words in a sentence may not reflect the best meaning and can be varied to produce the best scoring tree with the same overall structure but with a better meaning (Akers Col. 8 lines 6-12) based on user preferences.

Re claims 7 and 18, Kumai teaches a text mining apparatus ([0008]) according to Claim 4, further comprising:

However, means for adjusting the operation so that a user determines how similar patterns are identical and detecting the pattern

Akers teaches a translation engine includes a preparer, a parser, a graph maker, an evaluator, a graph scorer, a parse extractor, and a structural converter. The preparer examines the input text and resolves any ambiguities in input sentence boundaries. The preparer then creates and displays the input text in a parse chart seeded with dictionary entries. The parser parses the chart to obtain possible syntactic categories for the input text. The graph maker produces a graph of the possible syntactic interpretations of the input text based on the parse chart. The graph includes nodes and subnodes which are associated with possible interpretations of the input text. The evaluator, which comprises a series of experts, evaluates the graph of the possible interpretations and adds expert weights to the nodes and subnodes of the graph. The graph scorer uses the expert weights to score the subnodes, and the graph scorer then associates the N best scores with each node. The parse extractor assigns a parse tree structure to the preferred interpretation as determined by the graph scorer. The structural converter performs a structural conversion operation on the parse tree structure to obtain a translation in the target language (Akers Col. 4 lines 41-67).

Further, Akers teaches that the order in which nodes are visited and scored is a standard depth-first graph-walking algorithm. In this algorithm, nodes that have been scored are marked and are not scored again. During the scoring process, the scoring module evaluates dictionary entry nodes before evaluating any of the higher unit nodes. Each dictionary entry gives rise to a single score. For a unary rule, each of the k scores of the lower export is added to the expert values that apply to the unary rule, and the resulting vector of k scores is associated with the parent export. For a binary rule,

Art Unit: 2626

assume that the left child has g scores and the right child has h scores. Then a total of g times h scores are computed by adding each of the left child's scores to each of the right child's scores, and in addition, adding the expert values that apply to the binary rule. When g times h exceeds N, only the N best scores are kept with the parent node (Akers Col. 8 lines 6-12).

Furthermore, Akers teaches user interaction which can change the conversion of a sentence and its corresponding tree structure generation (Akers Col. 9 lines 1-45).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Kumai to incorporate adjusting the operation so that a user determines how similar patterns are identical and detecting the pattern as taught by Akers to allow for a user interface (Akers Col. 8 lines 6-12) having the ability to generate a tree structure which compares various sentential outputs depending on scores within the nodes of a tree structure (Akers Col. 4 lines 41-67), wherein the order of words in a sentence may not reflect the best meaning and can be varied to produce the best scoring tree with the same overall structure but with a better meaning (Akers Col. 8 lines 6-12) based on user preferences.

Re claims 8, 19, 24, and 25, Kumai teaches a text mining apparatus comprising:  
a storage unit that stores a set of documents ([0062] & Fig. 5) as a text mining object ([0008]);



an analyzing unit that reads and analyzes the document from the storage unit and obtains a sentence structure ([0062] & Fig. 5);

whether or not the structures are identical one every type of differences between the sentence structures ([0062] & Fig. 5);

whether or not the structures are identical ones every type of differences between attribute values ([0062] & Fig. 5);

a similar-structure generating unit that performs predetermined conversion operation of a partial structure of the sentence structure obtained by the analyzing unit in accordance with the first determination item generated by the similar-structure generation adjustment unit and generates similar structures having a similar meaning of the partial structure ([0062] & Fig. 5); and

a similar-pattern detecting unit that uses the similar structure generated by the similar-structure generating unit as an equivalent class of the partial structure on the generation source and detects the frequent pattern ([0060] & Fig. 3 frequency) by ignoring the difference between the attribute values in accordance with the second determination item of the similar-structure determination adjustment unit ([0062] & Fig. 5).

wherein the similar- structure generating unit comprises:

means for performing parallel modification of the sentence structure when the first determination item determines the parallel modification ([0062] & Fig. 5);

means for generating a partial structure of the sentence structure ([0062] & Fig. 5 resemblance degree for partial resemblance);

Art Unit: 2626

means for replacing a synonym in the sentence structure and/or partial structure by referring to a synonym dictionary when the first determination item includes replacement of the synonym ([0062] & Fig. 5); and

the similar-structure generating unit generates a similar structure of the sentence structure and sets the similar structure as the equivalent class ([0062] & Fig. 5)

However, Kumai fails to teach

means for performing non-directional branching of a directional branch of the sentence structure and/or partial structure when the first determination item determines the non-directional branching of the directional branch;

means for performing non-ordering of ordering trees of the sentence structure and/or partial structure when the first determination item determines the non-ordering of the ordering trees, and wherein;

Akers teaches a translation engine includes a preparer, a parser, a graph maker, an evaluator, a graph scorer, a parse extractor, and a structural converter. The preparer examines the input text and resolves any ambiguities in input sentence boundaries. The preparer then creates and displays the input text in a parse chart seeded with dictionary entries. The parser parses the chart to obtain possible syntactic categories for the input text. The graph maker produces a graph of the possible syntactic interpretations of the input text based on the parse chart. The graph includes nodes and subnodes which are associated with possible interpretations of the input text. The evaluator, which comprises a series of experts, evaluates the graph of the possible

Art Unit: 2626

interpretations and adds expert weights to the nodes and subnodes of the graph. The graph scorer uses the expert weights to score the subnodes, and the graph scorer then associates the N best scores with each node. The parse extractor assigns a parse tree structure to the preferred interpretation as determined by the graph scorer. The structural converter performs a structural conversion operation on the parse tree structure to obtain a translation in the target language (Akers Col. 4 lines 41-67).

Further, Akers teaches that the order in which nodes are visited and scored is a standard depth-first graph-walking algorithm. In this algorithm, nodes that have been scored are marked and are not scored again. During the scoring process, the scoring module evaluates dictionary entry nodes before evaluating any of the higher unit nodes. Each dictionary entry gives rise to a single score. For a unary rule, each of the k scores of the lower export is added to the expert values that apply to the unary rule, and the resulting vector of k scores is associated with the parent export. For a binary rule, assume that the left child has g scores and the right child has h scores. Then a total of g times h scores are computed by adding each of the left child's scores to each of the right child's scores, and in addition, adding the expert values that apply to the binary rule. When g times h exceeds N, only the N best scores are kept with the parent node (Akers Col. 8 lines 6-12).

Furthermore, Akers teaches user interaction which can change the conversion of a sentence and its corresponding tree structure generation (Akers Col. 9 lines 1-45).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Kumai to incorporate means for performing

Art Unit: 2626

non-directional branching of a directional branch of the sentence structure and/or partial structure when the first determination item determines the non-directional branching of the directional branch and means for performing non-ordering of ordering trees of the sentence structure and/or partial structure when the first determination item determines the non-ordering of the ordering trees, and wherein as taught by Akers to allow for a user interface (Akers Col. 8 lines 6-12) having the ability to generate a tree structure which compares various sentential outputs depending on scores within the nodes of a tree structure (Akers Col. 4 lines 41-67), wherein the order of words in a sentence may not reflect the best meaning and can be varied to produce the best scoring tree with the same overall structure but with a better meaning (Akers Col. 8 lines 6-12) based on user preferences.

However, Kumai fails to teach a similar-structure generation adjustment unit that generates a first determination item for determining, from a user input,

a similar-structure determination adjustment unit that generates a second determination item for determining, from a user input,

Akers teaches a translation engine includes a preparer, a parser, a graph maker, an evaluator, a graph scorer, a parse extractor, and a structural converter. The preparer examines the input text and resolves any ambiguities in input sentence boundaries. The preparer then creates and displays the input text in a parse chart seeded with dictionary entries. The parser parses the chart to obtain possible syntactic categories for the input text. The graph maker produces a graph of the possible

Art Unit: 2626

syntactic interpretations of the input text based on the parse chart. The graph includes nodes and subnodes which are associated with possible interpretations of the input text. The evaluator, which comprises a series of experts, evaluates the graph of the possible interpretations and adds expert weights to the nodes and subnodes of the graph. The graph scorer uses the expert weights to score the subnodes, and the graph scorer then associates the N best scores with each node. The parse extractor assigns a parse tree structure to the preferred interpretation as determined by the graph scorer. The structural converter performs a structural conversion operation on the parse tree structure to obtain a translation in the target language (Akers Col. 4 lines 41-67).

Further, Akers teaches that the order in which nodes are visited and scored is a standard depth-first graph-walking algorithm. In this algorithm, nodes that have been scored are marked and are not scored again. During the scoring process, the scoring module evaluates dictionary entry nodes before evaluating any of the higher unit nodes. Each dictionary entry gives rise to a single score. For a unary rule, each of the k scores of the lower export is added to the expert values that apply to the unary rule, and the resulting vector of k scores is associated with the parent export. For a binary rule, assume that the left child has g scores and the right child has h scores. Then a total of g times h scores are computed by adding each of the left child's scores to each of the right child's scores, and in addition, adding the expert values that apply to the binary rule. When g times h exceeds N, only the N best scores are kept with the parent node (Akers Col. 8 lines 6-12).

Furthermore, Akers teaches user interaction which can change the conversion of a sentence and its corresponding tree structure generation (Akers Col. 9 lines 1-45).

Therefore, it would have also been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Kumai to incorporate a similar-structure generation adjustment unit that generates a first determination item for determining, from a user input and a similar-structure determination adjustment unit that generates a second determination item for determining, from a user input as taught by Akers to allow for a user interface (Akers Col. 8 lines 6-12) having the ability to generate a tree structure which compares various sentential outputs depending on scores within the nodes of a tree structure (Akers Col. 4 lines 41-67), wherein the order of words in a sentence may not reflect the best meaning and can be varied to produce the best scoring tree with the same overall structure but with a better meaning (Akers Col. 8 lines 6-12) based on user preferences.

Re claims 9 and 20, Kumai teaches a text mining apparatus ([0008]) according to Claim 8, wherein the analyzing unit analyzes the document ([0062] & Fig. 5), and generates the sentence structure containing a clause having a node and indicating at least a dependency as a directional branch from the node on a modifier to the node on a modifiee determination,

an the attribute value includes the surface case and/or the information about the attached word, added to the sentence structure ([0062] & Fig. 5).

However, Kumai fails to teach generating the sentence structure containing a clause having a node and indicating at least a dependency as a directional branch from the node on a modifier to the node on a modifiee determination.

Akers teaches a translation engine includes a preparer, a parser, a graph maker, an evaluator, a graph scorer, a parse extractor, and a structural converter. The preparer examines the input text and resolves any ambiguities in input sentence boundaries. The preparer then creates and displays the input text in a parse chart seeded with dictionary entries. The parser parses the chart to obtain possible syntactic categories for the input text. The graph maker produces a graph of the possible syntactic interpretations of the input text based on the parse chart. The graph includes nodes and subnodes which are associated with possible interpretations of the input text. The evaluator, which comprises a series of experts, evaluates the graph of the possible interpretations and adds expert weights to the nodes and subnodes of the graph. The graph scorer uses the expert weights to score the subnodes, and the graph scorer then associates the N best scores with each node. The parse extractor assigns a parse tree structure to the preferred interpretation as determined by the graph scorer. The structural converter performs a structural conversion operation on the parse tree structure to obtain a translation in the target language (Akers Col. 4 lines 41-67).

Further, Akers teaches that the order in which nodes are visited and scored is a standard depth-first graph-walking algorithm. In this algorithm, nodes that have been scored are marked and are not scored again. During the scoring process, the scoring module evaluates dictionary entry nodes before evaluating any of the higher unit nodes.

Art Unit: 2626

Each dictionary entry gives rise to a single score. For a unary rule, each of the  $k$  scores of the lower export is added to the expert values that apply to the unary rule, and the resulting vector of  $k$  scores is associated with the parent export. For a binary rule, assume that the left child has  $g$  scores and the right child has  $h$  scores. Then a total of  $g$  times  $h$  scores are computed by adding each of the left child's scores to each of the right child's scores, and in addition, adding the expert values that apply to the binary rule. When  $g$  times  $h$  exceeds  $N$ , only the  $N$  best scores are kept with the parent node (Akers Col. 8 lines 6-12).

Furthermore, Akers teaches user interaction which can change the conversion of a sentence and its corresponding tree structure generation (Akers Col. 9 lines 1-45).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Kumai to incorporate generating the sentence structure containing a clause having a node and indicating at least a dependency as a directional branch from the node on a modifier to the node on a modifiee determination, as taught by Akers to allow for a user interface (Akers Col. 8 lines 6-12) having the ability to generate a tree structure which compares various sentential outputs depending on scores within the nodes of a tree structure (Akers Col. 4 lines 41-67), wherein the order of words in a sentence may not reflect the best meaning and can be varied to produce the best scoring tree with the same overall structure but with a better meaning (Akers Col. 8 lines 6-12) based on user preferences.



Art Unit: 2626

Re claims 10 and 21, Kumai teaches a text mining apparatus according to Claim 8, wherein the similar-pattern detecting unit detects a frequent similar pattern ([0060] and [0062] & Fig. 3 and 5).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL C. COLUCCI whose telephone number is (571)270-1847. The examiner can normally be reached on 8:30 am - 5:00 pm , Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (571)-272-7602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2626

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael C Colucci/  
Examiner, Art Unit 2626  
Patent Examiner  
AU 2626  
(571)-270-1847  
Examiner FAX: (571)-270-2847  
[Michael.Colucci@uspto.gov](mailto:Michael.Colucci@uspto.gov)

/Richemond Dorvil/  
Supervisory Patent Examiner, Art Unit 2626